

## REMARKS

Claims 1-27 are pending in the application. Claims 1, 8, 14, and 22 are independent. Claims 1, 8, 14, and 22 have been amended. These changes are believed to introduce no new matter and their entry is respectfully requested.

### Rejection of Claims 1-3 and 14-21 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 1-21 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,174,748 B1, to Jeon et al. (hereinafter “Jeon”) in view of U.S. 6,030,540 to Yamamoto et al. (hereinafter “Yamamoto”). To establish a *prima facie* case of obviousness, an Examiner must show three things: (1) that there is some suggestion or motivation to modify a reference or combine reference teachings to arrive at the claimed invention, (2) that there must be a reasonable expectation of success, and (3) that the references teach or suggest each and every element of the claimed invention. (MPEP §2143). Applicants respectfully traverse the rejection.

Amended independent claims 1 and 22 recite in pertinent part “***a buried tapered waveguide... a tapered rib waveguide*** disposed in the semiconductor layer proximate to the buried tapered waveguide, the tapered rib waveguide including a rib portion adjoining a slab portion, the slab portion of the rib waveguide adjoining the buried tapered waveguide, ***the buried tapered waveguide being beneath the slab portion of the tapered rib waveguide***” (emphasis added). Amended independent claim 8 recites in pertinent part “directing a mode of the optical beam propagating through the buried tapered waveguide into the slab portion of the rib waveguide adjoining the buried tapered waveguide, ***the buried tapered waveguide being beneath the slab portion of the tapered rib waveguide***” (emphasis added). Amended independent claim 14 recites in pertinent part “patterning a tapered rib waveguide in the silicon grown over the buried tapered waveguide using a tapered rib waveguide mask such that a slab portion of the tapered rib waveguide adjoins the buried tapered waveguide, ***the buried tapered waveguide is beneath the slab portion of the tapered rib waveguide***” (emphasis added). Support for these changes according to at least one of the present invention can be found in Applicants’ Specification at page 16, lines 1-10, and Figures 1 and 14.

Jeon does not appear to teach or fairly suggest a buried tapered waveguide beneath a slab portion of a tapered rib waveguide. Figure 2 in Jeon shows that the tapered portion 14A of the waveguide region 25 is above the backbone layer 22 of the rib waveguide not below the rib waveguide. Thus, the tapered portion 14A of the waveguide region 25 in Jeon is part of the rib waveguide, not buried beneath the rib waveguide.

Applicants respectfully submit that Yamamoto fails to make up for the deficiencies in Jeon. For example, Yamamoto does not teach or fairly suggest a buried tapered waveguide beneath a slab portion of a tapered rib waveguide. Accordingly, Applicants respectfully submit that Jeon and/or Yamamoto either separately or in combination fail teach or suggest each and every element of claims 1, 8, and/or 13. Applicants respectfully submit therefore that claims 1, 8, and/or 13 are not obvious in light of Jeon in view of Yamamoto. Because claims 1, 8, and/or 13 are not obvious in light of Jeon in view of Yamamoto, Applicants respectfully submit that claims 1, 8, and/or 13 are patentable over Jeon in view of Yamamoto and respectfully requests that the Examiner reconsider and remove the rejection to claims 1, 8, and/or 13.

Claims 2-7 properly depend from independent claim 1, claims 9-13 properly depend from independent claim 8, and claims 15-21 properly depend from independent claim 14, which independent claims Applicants respectfully submit are patentable over Jeon in view of Yamamoto. Accordingly, Applicants respectfully submit that claims 2-7, 9-13, and 15-21 are patentable for at least the same reasons that claims 1, 8, and 13, respectively, are patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir.1988)). Accordingly, Applicants respectfully request that the Examiner reconsider and remove the rejection to claims 1-13 and 14-21.

Rejection of Claims 6-7, 11, 16-19, and 26-27 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 6-7, 11, 16-19, and 26-27 under 35 U.S.C. § 103(a) as being unpatentable over Jeon in view in Yamamoto in further view of U.S. Patent No.6,819,814 B2, to Forrest et al. (hereinafter "Forrest"). Applicants respectfully traverse the rejection.

Claims 6-7 properly depend from independent claim 1, claim 11 properly depends from independent claim 8, and claims 16-19 properly depend from independent claim 14, which independent claims Applicants respectfully submit are patentable. Accordingly, Applicants respectfully submit that claims 6-7, 11, and 16-19 are patentable for at least the same reasons that claims 1, 8, and 13, respectively, are patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir.1988)). Accordingly, Applicants respectfully request that the Examiner reconsider and remove the rejection to claims 6-7, 11, and 16-19. Claims 26-27 will be discussed below with respect to independent claim 22.

Rejection of Claims 22-27 Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected claims 22-27 under 35 U.S.C. § 103(a) as being unpatentable in light of Jeon in view of Yamamoto in further view of U.S. Patent Application No. 2003/0031443 to Soljadic et al. (hereinafter “Soljadic”). Applicants respectfully traverse the rejection.

Amended independent claim 22 recites in pertinent part “***a buried tapered waveguide... a tapered rib waveguide*** disposed in the semiconductor layer proximate to the buried tapered waveguide, the tapered rib waveguide including a rib portion adjoining a slab portion, the slab portion of the rib waveguide adjoining the buried tapered waveguide, ***the buried tapered waveguide being beneath the slab portion of the tapered rib waveguide***” (emphasis added). Support for these changes according to at least one of the present invention can be found in Applicants’ Specification at page 16, lines 1-10, and Figures 1 and 14.

As discussed above, Jeon and Yamamoto alone or in combination do not appear to teach or fairly suggest a buried tapered waveguide beneath a slab portion of a tapered rib waveguide. Soljadic does not make up for the deficiencies in Jeon and Yamamoto in that Soljadic also does not teach or fairly suggest a buried tapered waveguide and a tapered rib waveguide as recited in claim 22. Accordingly, Applicants respectfully submit that Jeon, Yamamoto, and Soljadic either separately or in combination fail teach or suggest each and every element of claim 22. Applicants respectfully submit therefore that claim 22 is not obvious in light of Jeon in view of Yamamoto in further view of Soljadic. Because claim 22 is not obvious in light of Jeon in view of

Yamamoto in further view of Soljacic Applicants respectfully submits that claim 22 is patentable over Jeon in view of Yamamoto in further view of Soljacic and respectfully request that the Examiner reconsider and remove the rejection to claim 22.

Claims 23-27 properly depend from independent claim 22. Accordingly, Applicants respectfully submit that claims 23-27 are patentable for at least the same reasons that claim 22 is patentable. (MPEP §2143.03 (citing *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988))). Accordingly, Applicants respectfully request that the Examiner reconsider and remove the rejection to claims 22-27.

## CONCLUSION

Applicants submit that all grounds for rejection have been properly traversed, accommodated, or rendered moot, and that the application is in condition for allowance. The Examiner is invited to telephone the undersigned representative if the Examiner believes that an interview might be useful for any reason.

Respectfully submitted,  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

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